86-04515/

CONTRIBUTIONS TO NATURAL SCIENCE

PUBLISHED BY THE BRITISH COLUMBIA PROVINCIAL MUSEUM
675 BELLEVILLE STREET, VICTORIA, B.C., CANADA V8V 1X4

Number 2 ISSN 0829-609X September 30, 1985

Records and Notes on Alaskan Marine Algae. I.

MICHAEL J. WYNNE[1]

Accepted November 15, 1984

Abstract: The first reports for the occurrence of *Sphacelaria radicans* (Dillw.) C. Ag. and *Chromastrum kurogii* (Lee & Lindstrom) Kuiper in Alaska are made. Information on the occurrence of *Coilodesme fucicola* (Yendo) Nagai and *Dumontia simplex* Cotton at Amchitka Island, Aleutians, is provided. Reasons are presented for regarding *Pterosiphonia gardneri* Hollenb. as a taxonomic synonym of *P. hamata* Sinova.

KEY INDEX WORDS: Alaska, benthic plants, marine algae, *Phaeophyta*, *Rhodophyta*.

Introduction

Further investigations of the benthic marine algal flora of Alaska reveal additional new records. The present collections also provide a comparison of the morphological features of two species of *Pterosiphonia*, one from the northeastern North Pacific and the other from the northwestern North Pacific; the evidence indicates that these two taxa are conspecific.

Results and Discussion

Sphacelaria radicans (Dillw.) C. Ag.

This species is well known in European waters, ranging into the western Arctic Sea of the Soviet Union (Zinova, 1953; Prud'homme van Reine, 1982). A collection was made at Bird Cape, the northwesternmost tip of Amchitka Island, the Aleutians, 18.viii.1970, Wynne 3181 (MICH; L). This is the first record of this species from the eastern North Pacific, although it has been reported from Japan (Yendo, 1914). The plants were growing epilithically in a tidepool that was in the lower littoral range. Much sand was also present in the tidepool when the collection was made. The tufts of stiff, irregularly branched filaments were abundant; their height was 7 to 10 mm. Axes had diameters of 26–32 μm, which is at the lower end of the range of values given by Prud'homme van Reine (1982). Conspicuous pericysts, the presence of secondary transverse divisions in the secondary segments of main axes, the presence of medullary cells, and the lack of propagules were all typical for this species.

Coilodesme fucicola (Yendo) Nagai

Although this species has been recorded from Amchitka Island (Lebednik and Palmisano, 1977) on the basis of an annual progress report, collection information and other details were not provided. This species at Amchitka Island was consistently found as an epiphyte on *Laminaria longipes* Bory. The following collections were made: St. Markarius Point: 14.iii.1968, Wynne 1335; 14.viii.1970, Wynne 3067; Constantine Harbor dock: 24.iii.1968, Wynne 1497; 25.iii.1968, Wynne 1518; Top Camp: 17.viii.1970, Wynne 3166. Specimens of these four collections have been deposited in MICH.

The complanate thalli, with smooth to slightly undulate margins, superficially resemble blades of *Petalonia fascia* (O. F. Muell.) Kuntze, but blades of *Coilodesme* are hollow and bear sunken unilocular sporangia, not the plurilocular sporangia characteristic of *Petalonia*. The thalli are gradually tapered basally and have broadly rounded distal ends (Fig. 1). Widths of blades are 5 to 9 mm; lengths of blades range from 25 to 46 mm, although most are close to 30 mm long.

This alga was originally regarded by Yendo (1913) as a form of *Coilodesme bulligera* Strömf., differing from the typical form on the basis of its epiphytic nature and the 2–3-layered inner medulla, in contrast to the single-layered medulla of typical *C. bulligera*. Later Nagai (1940) elevated Yendo's form to the species level, justifying his move on morphological and anatomical features. Thalli of *C. bulligera* (Fig. 2) are generally less complanate or even bullate and have much greater overall dimensions: 120–200 (–300) mm high and 15–40 mm wide. Thalli of *C. bulligera* are usually dark brown, whereas those of *C. fucicola* are greenish or olive brown. Such differences are in accord with observations made at Amchitka Island, where *C. bulligera* is also present. The latter species was always epilithic, and the thalli were easily distinguishable from those of *C. fucicola* by the several criteria discussed above.

Chromastrum kurogii (Lee & Lindstrom) Kuiper

This microscopic alga was found growing on blades of *Constantinea rosa-marina* (Gmel.) Post & Rupr. The large and distinctive basal cell of *Chromastrum* was endophytic in the host blade, the same host as was described for the type collection from Hokkaido, Japan. This first record from Alaska was collected at Cyril Cove, Amchitka Island, Aleu-

[1] Division of Biological Sciences and Herbarium, University of Michigan, Ann Arbor, MI 48109, U.S.A.

BC
P705
C
C66:2
1986
c 5

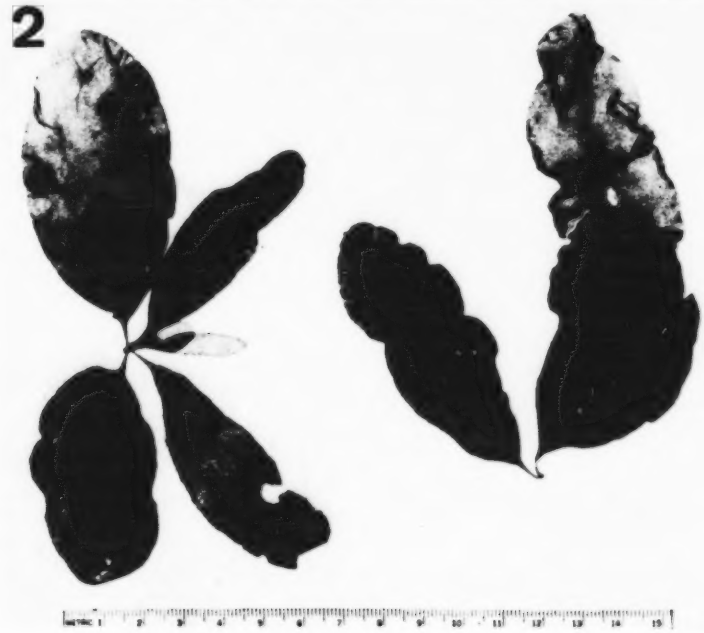

Fig. 1. *Coilodesme fucicola*. Habit. Fig. 2. *Coilodesme bulligera*. Habit.
(Numbers in scale bars indicate centimetres.)

tians, 5.ix.1967, *legit* Fred Weinmann 102b. A slide has been deposited in MICH.

This species was described as an *Audouinella* (Lee and Lindstrom, 1979) but was transferred to *Chromastrum* by Kuiper (1983) because of strong similarities to *C. alariae* (Jónsson) Papenf. *Chromastrum* is characterized by Kuiper as having a gametophyte with a unicellular base and with 3–4 carposporangia and a tetrasporophyte with a septately germinating spore, which produces a multicellular base bearing numerous erect axes.

Dumontia Simplex Cotton

Clumps of the soft, slimy blades of this species were found growing on an exposed mid-littoral "benchflat" at Rifle Range Point, Amchitka Island, Aleutians, on 24.iii.1968 (Wynne 1491), in MICH. Originally described from Korea by Cotton (1906), this species in now known from northern Japan, China, the Kurils and Sakhalin, U.S.S.R. (Tokida, 1954; Kang, 1966; Tseng, 1983). The present record is apparently the only collection from Alaska. Cystocarpic plants were present. Reproductive features of this species have been illustrated by Okamura (1928).

Pterosiphonia hamata Sinova
= *P. gardneri* Hollenberg

Hollenberg (1969) described a new species of *Pterosiphonia*, *P. gardneri*, which was reported to occur from northern Washington to Amchitka Island in the Aleutians. It has also been reported from several sites in British Columbia (Hawkes, *et al.*, 1979). The species had earlier been called *Pterosiphonia arctica* (J. Ag.) Setch. & Gardn. by Setchell and Gardner (1903) and Kylin (1925), but the

basis of that North Atlantic species (*Polysiphonia arctica* J. Agardh) had been demonstrated to be a genuine *Polysiphonia* by Rosenvinge (1910). Consequently, Hollenberg described the North Pacific alga as a new species, using a name that had appeared in an unpublished manuscript of Collins.

In examining a work by Sinova (1940) on the marine alga of the Commander Island in the Bering Sea, I noticed that her *Pterosiphonia hamata* had many characteristics that had been described for *P. gardneri*. Sinova's alga had a height of 160–200 mm, filiform axes, with six pericentral cells per segment and lacking cortication. The dichotomous-pinnate branching was remote, and branches are shown (her fig. 9) to arise at intervals of three successive segments. Axes are 350 μm in diameter at the base of the plant and 80–100 μm in the upper parts. Tetrasporangia occur in a single series in the ramuli, and cystocarps are ovoid-spheroidal on short pedicels. The alga from the Commander Islands has characteristic recurved laterals, giving a hamate or retroflexed appearance, which was the basis for Sinova's choice of the specific epithet.

The species described by Hollenberg, *P. gardneri*, had a height of 150–200 (up to 300) mm, 6 or 7 pericentral cells per segment, and filiform axes lacking cortication. The axes were alternately and distantly branched, mostly with three segments between successive branches. Upper axes were figured to have diameters to about 100 μm. Tetrasporangia occurred in straight series in ultimate and subultimate ramuli, and the cystocarps were globular. Ultimate ramuli were referred to as short and spine-like or with mucronate tips, "sometimes slightly uncinate". Some of the Alaskan collections included in Hollenberg's characterization of the species bear few to many recurved ramuli.

Although Hollenberg included only a single figure in his description (1969, fig. 8), he referred to figures of this same alga provided by Setchell and Gardner (1903, as *Pterosiphonia arctica*). The great resemblance between Sinova's fig. 10f of the upper portion of an axis and that of Hollenberg and also Setchell and Gardner's pl. 19, fig. 26, of a comparable aspect of their alga is striking. A comparison of the many morphological features as outlined in this discussion and also confirmed by a re-examination of the Amchitka Island specimens cited by Hollenberg leads to the conclusion that these two entities cannot be distinguished. *Pterosiphonia gardneri* has been recorded from 48° to 54.5° N. Lat. at its Washington and British Columbian sites and at 51°24′ N. Lat. at its Amchitka Island location. The Commander Islands, the type locality of *P. hamata*, are bisected by 55° N. Lat.

Another species occurring in the northwest North Pacific and seemingly close to *P. hamata* is *P. japonica* Nagai (1941). Nagai's species also has six pericentral cells per segment and uncorticated axes, but the branches are incurved, occurring at intervals of two rather than three segments. Nagai also indicated that his *P. japonica* has more tender fronds than those of *P. arctica sensu* Setch. & Gardn. and that its cystocarps are urceolate rather than pyriform.

Literature Cited

COTTON, A. D. 1906. Marine algae from Corea. Bull. Misc. Inform., R. Bot. Gard. Kew, 1906: 366–373.

HAWKES, M. W., C. E. TANNER, and P. A. LEBEDNIK. 1979. The benthic marine algae of northern British Columbia. Syesis **11**:81–115.

HOLLENBERG, G. J. 1969. New species of marine algae from Washington, U.S.A. Syesis **2**:163–169.

KANG, J. W. 1966. On the geographical distribution of marine algae in Korea. Bull. Pusan Fish. Coll. (Part, Nat. Sci.) **7**:1–125.

KUIPER, J. 1983. The life history of *Chromastrum alariae* (Jónsson) Papenfuss (Rhodophyta, Acrochaetiaceae). Acta Bot. Neerl. **32**:129–151.

KYLIN, H. 1925. The marine red algae in the vicinity of the Biological Station at Friday Harbor, Wash. Lunds Univ. Arsskr., N. F. Avd. 2, 21(9) 87 pp.

LEBEDNIK, P. A., and J. F. PALMISANO. 1977. Ecology of marine algae. In *The Environment of Amchitka Island, Alaska* (M. L. Merritt and R. G. Fuller, eds.), pp. 353–393. Technical Information Center, Energy Research and Development Administration, Springfield, Virginia.

LEE, Y. P., and S. C. LINDSTROM. 1979. *Audouinella kurogii*, a new marine red alga (Acrochaetiaceae) from eastern Hokkaido. Jap. J. Phycol. **27**:115–122.

NAGAI, M. 1940. Marine algae of the Kurile Islands. I. J. Fac. Agric. Hokkaido Univ. **46**:1–137.

———— 1941. The marine algae of the Kurile Islands. II. J. Fac. Agric. Hokkaido Univ. **46**:139–310.

OKAMURA, K. 1928. Icones of Japanese Algae. Vol. 5, No. 10. Kazamoshoba, Tokyo.

PRUD'HOMME VAN REINE, W. F. 1982. A taxonomic revision of the European Sphacelariaceae (Sphacelariales, Phaeophyceae). Leiden Bot. Series 6. × + 293 pp. E. J. Brill, Leiden.

ROSENVINGE, L. K. 1910. On the marine algae from Northeast Greenland. Medd. Grønland **43**:93–133.

SETCHELL, W. A., and N. L. GARDNER 1903. Algae of northwestern America. Univ. Calif. Publ. Bot. **1**:165–418.

SINOVA, E. S. 1940. The algae of the Commander Islands. Trans. Pac. Comm. Acad. Sci. U.S.S.R. **5**:165–243. [In Russian with English summary.]

TOKIDA, J. 1954. The marine algae of southern Saghalien. Mem. Fac. Fish. Hokkaido Univ. **2**:1–264.

TSENG, C. K. (Ed.) 1983. *Common Seaweeds of China*. English Edition. 316 pp. Science Press, Beijing.

YENDO, K. 1913. Some new algae from Japan. Nyt Mag. Naturvidensk. **51**:275–288.

———— 1914. Notes on algae new to Japan. II. Bot. Mag., Tokyo **28**:263–281.

ZINOVA, A. D. 1953. [Manual of the brown algae of the northern seas of the U.S.S.R.] Akad. Nauk SSSR, Moscow. 224 + 1 pp. [In Russian.]

Canadian Cataloguing in Publication Data

Wynne, Michael J. (Michael James)
Records and notes on Alaskan marine algae

(Contributions to natural science, ISSN 0829-609X ; no. 2)

Cover title.
ISBN 0-7726-0359-6

1. Marine algae - Alaska. I. British Columbia Provincial Museum. II. Title. III. Series.

QK571.5.A4W96 1985 589.39798 C85-092173-2

The British Columbia Provincial Museum's *Contributions to Natural Science* is a series of academic papers that are the results of original research in the life and earth sciences. Preference is given to research relevant to the Pacific Northwest, particularly morphology, taxonomy, systematics, evolution, ecology, paleobiology, geomorphology, and stratigraphy.

The museum also publishes original research in two complementary series: *Contributions to Human History* (anthropology, physical anthropology, archaeology, ethnology, history and linguistics), and *Contributions to Museum Studies* (conservation of artifacts and specimens, curatorial techniques, display techniques and evaluation, and museum administration, education and philosophy). Prospective authors are invited to contact the General Publications Committee, British Columbia Provincial Museum, 675 Belleville Street, Victoria, British Columbia, Canada V8V 1X4, for further information.

Queen's Printer for British Columbia ©
Victoria, 1985